

Abstract of the Disclosure

5 In accordance with the present invention, an x-ray diffraction apparatus and method are provided in which an x-ray or goniometer head can be adjusted in different directions to allow the head to direct x-rays at a part from various positions. In this manner, measurements can be taken from a wider region of the part without requiring that the part itself be moved or that an operator move the unit, which can be relatively heavy. In one aspect, the head can be rotated about its internal axis so that it can more readily direct x-rays along curved surfaces of parts while keeping a substantially constant distance therefrom. It is preferred that the apparatus be a portable unit including adjustment mounts to allow the x-ray head to be moved in the different directions so that it can be transported for use in the field at the site at which a part is located. In this instance, the unit allows for measurements to be taken from the part while it remains in service. Accordingly, the present portable unit allows for x-ray diffraction techniques to be used on parts where it is not practical or economic to remove them from service, such as cables or wire ropes used as tension members for bridges. Moreover, the preferred portable x-ray diffraction unit herein provides an easy to interpret readout of the results of its measurements by generating a map at the part site so that, for example, any abnormalities in stress measurements taken will be highlighted in comparison to adjacent points on the map where more normal measurements are shown.